Research Article

Rural-Urban Labor Migration, Remittances, and Its Effect on Migrant-Sending Farm Households: Northwest Ethiopia

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The purpose of this research is to examine the impact of rural-urban labor migration and remittances on rural agricultural productivity. A rigorous random selection process was used to pick 480 households from cross-sectional data. For this investigation, both primary and secondary data were used. Stata version 16 was used to examine both qualitative and quantitative data using descriptive (mean, standard deviation, and percentages) and econometric (three-stage least square technique) analyses. According to the descriptive data, the majority of respondents used their remittances for consumption, to acquire agricultural inputs, and to pay back their debts and tax payments. According to econometric studies, rural-urban migration has little influence on agricultural productivity. Remittances, cultivated land, livestock ownership, and extension services, on the other hand, have a positive and significant effect on agricultural productivity. In a nutshell, the link between migration, remittances, and agricultural output in agrarian and rural families is remarkable. Agriculture is the major source of income and mostly handles the liquidity issue. Agriculture production in the study region is labor intensive, and it is influenced by the amount of effort utilized in production as well as the socioeconomic characteristics of the household. As a result, it must address the major conundrum of agricultural productivity, particularly rural-urban migration and remittances. Address a knowledge gap, begin activities, and develop and implement multiple initiatives by various responsible stakeholders that are essential for the research topic. Furthermore, agricultural extension service delivery should be improved by timely recruiting, frequent agent training, and appropriate logistics.

1. Introduction

According to experts, migration has been a part of human dynamics from the beginning of time [1]. However, more than at any other point in human history, migration has become a hot topic for policymakers, legislators, the media, and residents of both industrialized and developing countries. Migration may contribute to inclusive and sustainable development in both origin and destination nations, while also helping migrants and their families when supported by suitable policies. International migration is inextricably linked to greater global economic, social, political, and technical shifts that impact a wide variety of high-priority policy concerns [2].

Rural-urban migration is the movement of people from rural villages, towns, and farms to urban centers in search of jobs. The rapid growth of rural-urban labor force migration has been a common feature of developing countries which occurs in response to natural and human-induced factors [3].

In the field of migration studies, rural-urban migration has both negative and positive socioeconomic effects on the areas from which migrants come. As far as the negative effects are concerned, it is recognized that rural-urban migration intensifies poverty, as it takes away the productive echelon and depletes the ranks of most-needed farm labor from rural areas [4].

According to a World Bank report in 2015, remittances to Ethiopia reached 23.75 billion Ethiopian Birr (an increase

of 20.9% over 2010). Despite recent reductions, the percentage of remittances to GDP has grown by about 35.6% since 1995, from 0.36% to 1.01% in 2015. The flood of these remittances into migrant-sending areas has encouraged households to engage in high-return enterprises, and remittances have long been part of risk-spreading methods against crop shocks [5].

Migration, according to the New Economics of Labor Migration (NELM), is part of a household strategy to overcome market failures such as inefficient loan and insurance markets. Remittances that provide households with income that is unrelated to farm revenue can help to alleviate production and investment limitations, as well as support investments in new production methods and input. Aside from the direct benefits of remittances, there may be multiplier effects on income, employment, and output in the nation of origin [6]. When it first emerged in the 1980s and 1990s, NELM challenged a previously dominant but more pessimistic view on migration and development, which claimed that remittances are frequently used for nonproductive investments, leading to the development of passive, nonproductive, and remittance-dependent communities [7].

In theory, migration is thought to boost investment, trade, and technology adoption through knowledge transmission, but just a few studies have shown evidence that migration boosts wages and employment [8]. Earnings from remittances provided by migrants and labor loss due to migrants leaving their homes are two key consequences of migration on migrant families. Remittances may have the positive potential consequence of alleviating financing constraints in production and absorbing any risk scenarios in output by the household. A negative effect may occur when the household may compete for human capital as a result of the loss of household members due to migration, adding to the existing limitation to investment in high productivity [9].

Migration has been viewed as a way of life in Africa, with people migrating from place to place for political, socioeconomic, and demographic reasons. Regional inequalities and disparities in economic possibilities have been exacerbated by the concentration of investment in industry, commerce, and social services in cities. Furthermore, rural and agricultural production has remained poor, leading to rural outmigration to urban and industrial sectors [10].

If unregulated, the ongoing migration of young, educated, talented, and energetic agricultural labor forces into urban regions is expected to erode agriculture's position in particular and the rural economy in general through labor shortages and decreased agricultural production. It has the potential to exacerbate local economic misery by decreasing its appeal to new sectors, raise the labor load on family members, particularly women and children left behind, and lead to family disintegration [11].

Agriculture in Ethiopia is the foundation of the country's economy, accounting for 33.3% gross domestic product (GDP), and 83.9% of exports. In the country, about 83.9% of the total population lives in rural areas and agriculture is the primary source of rural income as 80% of the rural labor force is engaged in this sector of the main source of their livelihood.

Ethiopia is a significant migrant-sending and refugee-hosting country in Africa. Nonetheless, compared to other African nations, Ethiopia has a relatively low overall international migration rate; in 2015, over two million Ethiopian migrants, accounting for 2.07% of the entire population, resided outside the country. According to figures from the Ethiopian Ministry of Labor and Social Affairs (EMLSA), over 460,000 Ethiopians left the country between 2008 and 2013. Internal or circular migration is also expected to be larger in Ethiopia than external movements, having households with internal migrants accounting for 5% of the overall population [12].

Agriculture is the principal source of income for rural households in East Gojjam Zone, Northwest Ethiopia, and so, agricultural output earnings are the primary sources of liquidity for the household. Agriculture production in the East Gojjam Zone of Northwest Ethiopia is labor intensive and is influenced by the quantity of labor utilized in production as well as the socioeconomic factors of the household. As a result, rural-urban labor mobility has an impact on agricultural productivity in the source region. Therefore, labor loss due to migration might increase the labor constraints for agricultural productivity. On the other side, profits are in the form of remittances and migrant money, which may relieve credit limitations and aid in agricultural production investments. As a result, it is critical to understand the factors that influence agricultural productivity, notably rural-urban migration and remittances in the East Gojjam Zone in Northwest Ethiopia.

Understanding agricultural productivity and the variables influencing production, such as rural-urban migration, remittances, and socioeconomic family characteristics, is critical for increasing agricultural production in developing nations like Ethiopia. To the best of our knowledge, however, this issue has been seldom investigated in the current literature by using Ethiopia, particularly in the East Gojjam Zone of Northwest Ethiopia, as a case study. As a result, the purpose of this article is to contribute to this area by examining the effects of rural-urban labor mobility and remittances on agricultural production in rural areas of East Gojjam Zone, Northwest Ethiopia.

2. Materials and Methods

2.1. Research Design. The cross-sectional design was employed in this study because it is particularly fit to assess the effect of rural-urban labor migration on the agricultural output of migrant-sending families, remittances, and various socioeconomic agricultural production determiners. It is also used to collect data on the current condition of phenomena in order to define what exists in terms of variables or circumstances in a scenario. Both quantitative and qualitative research methods were used to collect data. Both techniques are regarded to generate a greater understanding of the study problem than each approach alone.

Hence, the research design has considered the following specific issues to address in the method section:

(i) The effect of rural-urban labor migration on agricultural production of migrant-sending households in the study areas?

(ii) How remittances are utilized and the effect of remittances on agricultural production in the study areas?

(iii) What are the heterogeneous socioeconomic determiners of agricultural production in East Gojjam Zone, Northwest Ethiopia?

2.2. Data Type and Sources. It was unquestionably necessary to have a tangible source of data in the study process to address the effect of rural-urban labor migration on agricultural output, the utilization of remittances, and various socioeconomic agricultural production determiners. This study employs both primary and secondary data sources in order to obtain comprehensive and important information. Primary data were gathered from sample households, extension agents, elders, village administration, youth affairs and study, woreda agricultural administration, and woreda labor administration. Secondary data sources were documented in any relevant documents in the research region and sample village. Furthermore, other sources such as journal articles, novels, and government data were studied to gain a thorough understanding of the study's topic matter.

2.2.1. Methods and Procedures for Sampling. Sampling design is a system that uses statistical design to take small ratios of data from a large population in order to obtain information about that large population from the sample observations. The information was gathered from households in the East Gojjam Zone's districts of Machakel, Basso Liben, Bibugn, and Hulet Ej Enese. In this investigation, a multistage sampling approach was used. First, the districts of Machakel, Basso Liben, Bibugn, and Hulet Ej Enese were purposely chosen due to high rural labor migration from the districts of the East Gojjam Zone. Second, in each district, six migrant susceptible counties were purposefully chosen. In the third phase, two villages were chosen at random from each district. Fourth, ten (10) households were chosen at random from the forty-eight (48) villages. As a result, the sample size for this study was 480 homes. A household chosen for the survey comprises at least one migrant.

2.2.2. Interviewing Key Informants and Discussion in a Focus Group. The key informant participants were likewise chosen using the purposive sampling approach. Participants who serve as sample units are chosen based on their expertise and professional contributions. Qualitative data require the presence of competent individuals from many types of stakeholders. As a result, each district sampled 42 key informants, including one village agriculture officer, youth affairs, elders, village administration, and extension workers. Moreover, each woreda agricultural administration and woreda labor administrated were included in the key informant interviews.

Another qualitative approach that would be utilized to collect verbal information relating to the research goals was focus group discussion. In each sample district, two focus group discussion areas were chosen, and in each area, two FGDs were held, one with a male participant and the other including a female during the collection of fresh qualitative data. For each FGD, 7-8 males and females from the sample area are chosen at random.

2.3. Data Collection Methods. Three major methods were used to acquire data for this study: a document review, interviews, and conversations with key informants. In this study, household interviews were done using a semistructured questionnaire, whereas key informant interviews were conducted using an unstructured, open-ended checklist. Secondary data are also gathered through document reviews. Books, journals, manuscripts, research papers, and government reports were among the materials examined.

2.4. Data Analysis Methods. The study was to analyze, synthesize, and present the data using both descriptive and inferential statistics to satisfy the defined objectives and answer the supplied research questions. The descriptive statistical techniques of analysis were used to assess household perspectives and confirm quantitative data gathered through surveys. The quantitative data were specifically evaluated, summarized, and presented in the form of frequency, percentage, and tables. The approach by which researchers conclude a population based on the information contained in the sample selected from that group is known as the inferential statistics method of analysis. For text data in this study, qualitative content analysis was performed.

2.4.1. Methods of Data Analysis. To address the specified objectives and to answer the given research questions, the study was to analyze, summarize, and present the data using both descriptive statistics and inferential statistics. The descriptive statistics methods of analysis were employed to analyze the views of households and validate the quantitative data that were obtained through questionnaires. Specifically, the quantitative data were analyzed, summarized, and presented in the form of frequency, percentage, and tables, respectively. The inferential statistics method of analysis is the procedure by which researchers reach a conclusion about a population based on the information contained in the sample drawn from that population. This study used qualitative content analysis for text data. This information was gathered by KII and FGD employing open-ended survey questions.

2.4.2. Model Specification

(1) Three-Stage Least Squares (3SLS). The three-stage least squares estimator was introduced by [13]. It can be seen as a special case of multiequation GMM where the set of instrumental variables is common to all equations. If all repressors are predetermined, then three-stage least squares (3SLS) reduce to seemingly unrelated regressions. 3SLS estimates are consistent and asymptotically normal and, under some conditions, asymptotically more efficient than

single equation estimates. In this study, the three-stage least squares (3SLS) are employed to estimate the model.

Three-stage least squares refer to a method of estimation that combines a system of equations, sometimes known as seemingly unrelated regression (SUR), with two-stage least squares estimation. It is a form of instrumental variables estimation that permits correlations of unobserved disturbances across several equations, as well as restrictions between the coefficients of different equations, and improves upon the efficiency of equation-by-equation estimation by taking into account such correlations across equations.

Three-stage least squares are used in this study due to the fact that the estimates are consistent, and the estimates are more efficient compared to 2SLS estimates given that the system is correctly specified. It reduces the simultaneity bias and takes into account the correlation between residuals of different equations and therefore gives more efficient estimates.

The new economics of labor migration (NELM) is based on the assumption that the migration decision is made at the household level as a family strategy to achieve certain family goals. An income-maximizing household tends to allocate such resources as land and labor to high-productivity or labor-saving activities. The allocation depends on households' characteristics such as population, farm size, and other relevant variables. Households may face market or liquidity constraints on investing in high-productivity technologies, such as new hybrid seeds or more effective fertilizers. Moreover, their willingness to bear the risks of applying a high-productivity technology also matters. In addition, migration itself may be like the incomplete adoption of new technology, with an individual spending part of the year as a labor migrant and the rest of the year on the farm [14]. It can help overcome liquidity and risk constraints by improving wage earnings, that is, remittances become the compensation for the lost labor. At the same time, the impacts of losing labor on agricultural productivity might vary depending on local labor market conditions as well as households' consideration of agricultural profitability. If the labor market is complete, the lost family labor can be substituted for by hired labor. If farming is profitable, a household can invest in high-productivity technology to offset the yield reduction brought by labor withdrawal.

The key relationships estimated in this study comprise three equations. Suppose a household's revenue from the total agricultural output Y is a function of rural-urban labor migration (M) and remittances (R), as well as the household's socioeconomic characteristics X_i, as follows:

$$Y_i = \beta_0 + \beta_1 M + \beta_2 R + \beta_3 X_i + \varepsilon_y, \tag{1}$$

where Y_i represents the household's revenue from total agricultural output and M represents rural-urban labor migration as measured by the number of migrants in the household. R denotes the amount of remittance received in the household, X_i denote the socioeconomic characteristics of the household (age, gender, family size, educational level, total farmland size, total livestock ownership, credit access, extension service, irrigation, agricultural pesticide, number of households in the household, and migrants average

education), B_i denote the regression coefficients, and ε_y denotes the random disturbance item.

According to Taylor et al. [15], NELM hypothesizes that the constraint limiting the amount of the fixed resource that can be allocated to the production of the higher return good is a function of migration and remittance. Rural-urban migration leads to a reduction in family labor, while remittances increase available capital for production.

Because remittances are produced by migrant family members, they are a function of migration (M) and household's socioeconomic characteristics (X_i):

$$R = \alpha_0 + \alpha_1 M + \alpha_2 X_i + \varepsilon_R. \tag{2}$$

Rural-urban labor migration is, in turn, influenced by the socioeconomic characteristics of individuals and households (X_i); rural-urban labor migration is represented in a simplified form:

$$M = \delta_0 + \delta_1 X_i + \varepsilon_M. \tag{3}$$

Rural-urban migration and remittances are determined endogenously in these equations, along with the socioeconomic characteristics of households.

3. Results and Discussion

The frequency of remittances varies with distance from the destination, the presence of very close relatives in the village, the migrant's income levels at the destination, the economic background of the migrant-sending household, the migrant's duration of residence away from home, and the migrant's occupation. When the village is close to destination, the migrant will frequently take money back or have a relative visit him/her to collect it. Wage migrants with higher per capita incomes are more likely to send money back to the village on a regular basis. The more frequently money is received by rural families from rural migrants, the less money they may receive.

The frequency with which a migrant sends remittances to his or her parents and relatives in rural areas varies greatly between households. The majority of respondents stated that remittances are irregular and are typically sent following annual festivals such as New Year's, *Meskel* (Finding of the True Cross celebrated on September 24), *Gena* (Birthday of Jesus Christ), *Timket* (Ethiopian Epiphany), and Easter. Other intermittent reasons for remittances by migrants include assisting relatives back home, performing marriage ceremonies and funerals, and serving as a backup for hardships.

In this study, the average number of remittances received by a migrant-sending and remittance-recipient household per year was 2.18. The highest number of remittances received by a migrant-sending household was three, while the lowest number of remittances received within a year was only one. Remittances were received three times, twice, and once a year by 38.89%, 39.36%, and 21.55% of migrant-sending households, respectively (Table 1).

According to studies, the number of remittances received and how they are used in the areas of origin have a

TABLE 1: Frequency of remittance.

Number of times households received remittance per year	Migrant-sending households' location									
	Machakel		Bibugn		Basso Liben		Hulet Ej Enese		Total HHs	
	Number of obs. (n)	%	Number of obs. (n)	%	Number of obs. (n)	%	Number of obs. (n)	%	Number of obs. (n)	%
1	3	16.67	4	17.39	5	9.41	5	22.73	17	21.55
2	8	44.44	10	43.48	5	29.41	9	40.91	32	39.36
3 and above	7	38.89	9	39.13	7	41.18	8	36.36	31	38.89
Total (n)	18	100	23	100	17	100	22	100	80	100

Source. Own survey computation (2022).

significant impact on the socioeconomic status of migrant-sending households. Remittances improve receiving households' income status, human capital formation, and household consumption and investment. Households take loans from both private lenders and microfinance institutions to buy fertilizer and finance microbusinesses. They frequently accept funds without clearly defined micro-investment projects. In a situation where their projects fail and the money is spent as part of the consumption basket and where other income-generating generating opportunities are scarce, family members resort to migration to obtain cash income to repay debt [7].

The study revealed the different purposes for which migrant-sending households spent the majority of their remittances. The most common uses of remittances were for consumption such as food and clothing (41.11%), agricultural inputs such as seeds, fertilizers, livestock hired labor, and rent land (39.82%), loan/debt repayments and land tax payment (25.48%), holidays and funerals (8.56%), and improving or building housing (7.45%) (Table 2).

3.1. Rural-Urban Migration and Its Effect on Migrant-Sending Households.
Migration has two effects on agricultural production. The first is the loss of labor due to migration, which may tighten the labor constraint for agricultural production, and the second is the earnings of migrants in the form of remittances, which may loosen credit constraints and aid in agricultural production investments. These two effects on agricultural income may be positive, negative, or revoke each other. A positive effect would imply that migration supplements agricultural production, whereas a negative effect would imply that migration reduces agricultural productivity; however, the discovery of a significant effect is evidence in support of NELM [9].

It is assumed that rural-urban migration causes a labor shortage during the peak season; it increases the household's loan repayment performance, decreases agricultural income, increases the ability to use improved agricultural inputs, improves household income and asset position, and the remaining members get more farm plots. As can be seen from Table 3, 31.23% of migrant-sending households face labor shortages during the peak season. Rural-urban migrants benefit 26.92% of migrant-sending households because the income they receive from migrants enables them to repay loans and purchase agricultural inputs. However, due to rural-urban migration, 15.73% of households see a decrease in agricultural income. Due to rural-urban migration, 18.165% and 7.95% of migrant-sending households can purchase agricultural inputs, respectively, and the remaining members get more farm plots.

3.2. Econometric Analysis.
The three-stage least squares (3SLS) estimator was introduced by [9]. It is a subset of the multiequation of the moment in which the set of instrumental variables is shared by all equations. If all of the regresses are fixed, three-stage least squares (3SLS) reduce to seemingly unrelated regressions. 3SLS estimates are consistent and asymptotically normal and are asymptotically more efficient than single equation estimates under some conditions. The _Y, _M, and _R stochastic terms are assumed to be normally and independently distributed. However, because the exogenous variables that influence migration may also influence yield and remittance, the three disturbances are likely to be related. The three-stage least squares (3SLS) method was used to estimate the model in order to solve the concurrent correlation between these equations. The three-stage least squares (3SLS) method is used to estimate the model in this study. The result of the three-stage least squares regression is as follows;

As shown in Table 4, the amount of remittance, cultivated land, and livestock extension services have a positive and significant impact on agricultural production. Agricultural pesticides, on the other hand, have a negative and insignificant impact on agricultural production. Rural-urban migration has almost no effect on agricultural production. This is consistent with the Lewis model of development, which holds that the underdeveloped economy is divided into two sectors: a traditional, overpopulated rural subsistence sector with zero marginal labor productivity and a modern, high-productivity urban industrial sector into which labor from the subsistence sector is gradually transferred. The Lewis model assumes that there is surplus labor in the sense that it can be removed from the traditional agricultural sector without having caused the output to decrease.

Furthermore, rural-urban migration results in a loss of human resources for rural areas. If labor is abundant in the villages, this labor loss has no opportunity cost. That is, village households can send out migrants without losing production, and thus, labor productivity increases. According to the table, as the number of remittances increases, the income from agricultural production increases. This is because remittances have the positive potential effect

TABLE 2: Utilization of remittance.

Utilized remittance	Machakel		Bibugn		Basso Liben		Hulet Ej Enese		Total HHs	
	Number of obs. (n)	%	Number of obs. (n)	%	Number of obs. (n)	%	Number of obs. (n)	%	Number of obs. (n)	%
Recipient households	18	22.50	23	28.75	17	21.25	22	27.50	80	17.13
To buy agricultural inputs	43	37.39	56	47.86	46	39.31	37	31.36	186	39.82
For holidays and funerals	7	6.08	9	7.69	11	9.4	13	11.02	40	8.56
Improving or building housing	13	11.30	4	3.41	7	5.98	11	9.32	35	7.45
Repayments and payments	22	19.13	44	31.63	33	28.21	27	23.08	119	25.48
For consumption	47	40.87	54	46.15	34	29.05	57	48.01	192	41.11

Source. Own survey computation (2022).

TABLE 3: Effects of rural-urban migration on migrant-sending households.

Effects of rural-urban migration	Machakel		Bibugn		Basso Liben		Hulet Ej Enese		Total HH	
	Number of obs. (n)	%	Number of obs. (n)	%	Number of obs. (n)	%	Number of obs. (n)	%	Number of obs. (n)	%
Creates labor shortage in peak seasons	33	28.70	5	4.27	61	52.14	47	39.83	146	31.23
Increases household's loan repayment	16	13.91	54	46.15	21	17.95	35	29.66	126	26.92
Able to purchase agricultural inputs	11	9.57	45	38.46	7	5.98	22	18.64	85	18.16
Decreases agricultural income	39	33.91	13	11.11	17	14.53	4	3.39	73	15.73
The remaining members get more farm plots	16	13.91	0	0.00	11	9.40	10	8.47	37	7.95

Source. Own survey computation (2022).

of alleviating credit constraints in production and absorbing any risk scenarios in production by the household.

The effect of the amount of cultivated land owned by the household on agricultural production is positive and statistically significant. In Ethiopia, there is only about 33.6% of agricultural land as a share of land area, but there are still problems with farmers' access to land, weak land administration, and inefficient land markets.

The effect of the amount of livestock owned by the household on agricultural production is positive and statistically significant. From the model, increasing the livestock resources of the household increases production. This is because livestock such as oxen, horses, and donkeys are used for farming in the study area. Having such livestock can loosen production constraints and facilitate agricultural farming.

Agricultural extension service providers have a significant and positive impact on agricultural production. They are critical in increasing agricultural productivity, improving food security, improving rural livelihoods, and promoting agriculture as a pro-poor economic growth engine. The extension is a critical support service for rural producers

facing new challenges in agriculture, such as global food and agricultural system transformation.

Agricultural pesticide use has a negative and significant impact on agricultural production. This is due to the fact that the widespread use of pesticides in agricultural production can degrade and harm the community of microorganisms living in the soil, especially when these chemicals are overused or misused, causing chemical compounds to accumulate in the soil. Many of the chemicals used in pesticides are persistent soil contaminants, whose effects can last for decades and have a negative impact on soil conservation.

Agricultural production has a significant and positive impact on rural-urban migration. As agricultural production revenue rises, so does rural-urban migration. An increase in a household's agricultural output tends to increase the household members' proclivity to migrate to cities to work. However, an increase in agricultural production revenue may reduce the number of days of migration because it increases the number of days of farming work.

The amount of cultivated land has a significant negative impact on rural-urban migration. Increasing household agricultural land resources will reduce rural-

TABLE 4: Parameter estimation of the three-stage least square regression model.

Variable	Coefficient	Std. error	t-statistic	Prob.
Agri-prod				
Rural-urban migration	0.3634962	0.3109939	1.17	0.242
Amt of remit	0.0308621	0.0521634	2.59	0.014**
Age	0.0001046	0.0011102	0.09	0.925
Edu-level	0.0045924	0.0019496	0.42	0.671
Fam-size	0.0196487	0.0175491	1.12	0.263
Cult-land	0.1635392	0.0312445	5.23	0.000*
Liv-stock	0.0342955	0.0148529	2.31	0.021**
Cer-access	−0.007219	0.0560591	−0.13	0.898
Ext-service	0.0896	0.232103	2.39	0.021**
Irrigation	0.0188608	0.0869364	0.22	0.828
Agri-pest	−0.1084733	0.2478107	−2.44	0.017**
_Cons	9.341321	0.984844	9.49	0.000*
Rural-urban migration				
Agri-prod	1.403328	0.6005912	2.34	0.019**
Sex	0.0037719	0.045958	0.08	0.935
Num-stu	0.0497263	0.0433169	1.15	0.251
Fam-size	−0.0347043	0.0367421	−0.94	0.345
Cult-land	−0.2318789	0.1082901	−2.14	0.032**
Liv-stock	−0.0544232	0.0244454	−2.23	0.026**
_Cons	−12.51024	6.259922	−2.00	0.046**
Amt of remit				
Rural-urban migration	5.423236	1.241401	4.37	0.000*
Livestock	0.0293703	0.0985551	0.30	0.766
Farm size	0.0754538	0.1640279	0.46	0.646
Migrants' education	−0.2286891	0.2728889	−0.84	0.402
Num-stu	0.6959269	0.2099912	3.31	0.001**
_Cons	0.0243562	3.598579	0.01	0.995

*, **1% and 5% level of significance, respectively.

urban migration. The larger a family's cultivated land area, the less willing they are to migrate to cities. The majority of migrants migrate due to a lack of agricultural land and other job opportunities. Rural landowners, on the other hand, are hesitant to migrate because they risk losing their holding if they leave rural areas. Thus, while limited rural land availability may encourage rural-urban migration, land policy constraints may reduce incentives to migrate by increasing the costs of leaving rural areas.

The availability of livestock resources has a significant negative effect on rural-urban migration. In accordance with the model, increasing the household's livestock resources would reduce rural-urban migration. Families with a large livestock herd are less likely to have rural-urban migrants. Because of the abundance of livestock resources, households can raise funds for their family members, which can then be used as a source of startup capital.

Rural-urban migration has a significant positive effect on remittances. The amount of remittances increase as rural-urban migration increases. This is because remittances are a product created by migrants as very desirable rewards that are eagerly awaited by migrants' families back home.

Migrants remit a portion of their wage earnings to support their families of origin for a variety of reasons. Remittances are a method of alleviating supply constraints and increasing agricultural productivity.

The number of students in a household who need to be supported (current students) has a positive and significant impact on remittances. When the number of students in a household increases, so does the amount of remittances. If a household has a large number of students, migrants send more money back to their families.

4. Conclusions and Recommendations

For the following reasons, the relationship between migration, remittances, and agricultural productivity may be of particular interest in agrarian rural households. Agriculture is the primary source of income for rural households, so agricultural production proceeds are the primary source of liquidity for the household. If households face constraints on investing in migration in general, one would expect migration to come from more productive households. Alternatively, if less productive households send out migrants, one would infer that credit constraints are not an issue; and higher productivity households find that retaining potential migrants' labor locally is more productive.

The effect of rural-urban labor migration and remittances on agricultural production in rural areas of East Gojjam Zone, Northwest Ethiopia, is investigated in this study. The descriptive analysis shows that the amount of remittances received and how they are used in the areas of origin have a significant impact on the socioeconomic status of the migrant-sending households. Remittances are mostly used for consumption in this study, such as food and clothing, as well as to purchase agricultural inputs such as seeds, fertilizer, livestock, hired labor, rent land, and so on. Remittances are also used to pay for loan/debt repayments and land tax payments for holidays and funerals, as well as to improve or build housing.

The descriptive analysis shows that rural-urban migration creates labor shortages during peak seasons in the study area. On the other hand, migrant-sending households are benefited from rural-urban migrants since the income they receive from migrants enables them to pay back their loans and purchase agricultural inputs as well, as it enhances household consumption. In addition, rural-urban migrants are for sending areas as they often send or bring back money, which could help in improving agricultural production, improving the rural household's income, debt repayment position, asset formation, easing the pressure over agricultural land resources, and quality of life enhancement.

According to the econometric analysis, rural-urban migration has no effect on agricultural production. Remittances, on the other hand, have a positive and significant impact on agricultural production. We can conclude that, even if labor migration from rural to urban areas causes a labor shortage during peak seasons, remittances assist migrant-sending households in alleviating credit constraints in agricultural production, allowing the migrant-sending

households to purchase agricultural inputs and absorb any risk eventualities in production. Aside from that, cultivated land, livestock ownership, and extension services all have a positive and significant impact on agricultural output. The use of agricultural pesticides, on the other hand, has a negative and significant impact on agricultural production.

The study concluded that the majority of remittance receiving households use remittances for consumption such as food and clothing, as well as to purchase agricultural inputs such as seeds, fertilizers, livestock, hired labor, and rent land. Even if rural-urban migration reduces labor availability during peak seasons, it increases loan repayment and allows rural households to purchase agricultural inputs. According to the econometric analysis, rural-urban migration has no effect on agricultural production. Remittances have a significant and positive impact on agricultural production. This suggests that remittances assist migrant-sending households in alleviating credit constraints in agricultural production, allowing the migrant-sending households to purchase agricultural inputs and absorb any risk scenarios in production.

This study can be applied more broadly in national verdicts and will be used for policy analysis after considering both spatial and temporal dynamics. This study used cross-section data that were only applied for a short period of time. Furthermore, it will be used with a large number of households and will take into account more variables that influence rural-urban integration.

The study suggests the following policy implications based on the findings of the analysis.

(i) Rural people should be trained on how to make the best use of remittances and instill a culture of saving and investing to ensure long-term rural economic development

(ii) Agricultural extension service delivery should be improved through timely recruitment, periodic agent training, and adequate logistics

(iii) Educate and train rural farm households on agricultural pesticide use

(iv) Agricultural extension service providers should provide training in sowing seed and land use administration to rural farm households

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

Haymanot Bassie, Teshome Sirany, and Bizuayehu Alemu were the major contributors to the study, proposed the problem, cooperated in data collection, translated the local language during data collection, analyzed the data, wrote the final manuscript, and agreed and approved the manuscript for publication.

References

[1] T. Faist, "Cross-border migration and social inequalities," *Annual Review of Sociology*, vol. 42, no. 1, pp. 323–346, 2016.

[2] A. Triandafyllidou, *Handbook of Migration and Globalisation*, Edward Elgar Publishing, Cheltenham, UK, 2018.

[3] M. P. Todaro and S. C. Smith, *Economic Development*, Pearson, Addison Wesley, New York, NY, USA, 11th edition, 2012.

[4] A. Abeje, "Causes and effects of rural-urban migration in Ethiopia: a case study from Amhara region," *African Studies*, vol. 80, pp. 77–94, 2021.

[5] M. A. Redehegn, D. Sun, A. M. Eshete, and C. N. Gichuki, "Development impacts of migration and remittances on migrant-sending communities: evidence from Ethiopia," *PLoS One*, vol. 14, no. 2, Article ID e0210034, 2019.

[6] E. J. Taylor, "The new economics of labour migration and the role of remittances in the migration process," *International Migration*, vol. 37, no. 1, pp. 63–88, 1999.

[7] H. De Haas, *Remittances, Migration and Social Development: A Conceptual Review of the Literature*, United Nations Research Institute for Social Development, Geneva, Switzerland, 2007.

[8] R. E. Lucas, "The economic well-being of movers and stayers: assimilation, impacts, links and proximity," in *Proceedings of the Conference on African Migration in Comparative Perspective*, Johannesburg, South Africa, 2003.

[9] S. Rozelle, J. E. Taylor, and A. Debrauw, "Migration, remittances, and agricultural productivity in China," *The American Economic Review*, vol. 89, no. 2, pp. 287–291, 1999.

[10] W. Beneberu Assefa, *Economic Impact of Rural-Urban Migration on Income and Poverty of Migrant Sending Rural Households: With Evidences from Southern Ethiopia*, Ruhr University of Bochum, Bochum, Germany, 2012.

[11] M. K. Teferee, "Rural youth outmigration, remittance and its impacts on migrant-sending households in Gojjam and Wolayta, Ethiopia," *Journal of Geography and Regional Planning*, vol. 10, no. 4, pp. 57–68, 2017.

[12] B. Carter and B. Rohwerder, "Rapid fragility and migration assessment for Ethiopia," *Rapid Literature Review*, vol. 2, pp. 1–47, 2016.

[13] H. Theil, *Henri Theil's Contributions To Economics and Econometrics: Econometric Theory and Methodology*, Springer Science & Business Media, Berlin, Germany, 1992.

[14] J. E. Taylor and P. L. Martin, "Human capital: migration and rural population change," *Handbook of Agricultural Economics*, vol. 1, pp. 457–511, 2001.

[15] J. E. Taylor, S. Rozelle, and A. De Brauw, "Migration and incomes in source communities: a new economics of migration perspective from China," *Economic Development and Cultural Change*, vol. 52, no. 1, pp. 75–101, 2003.